British Journal of Educational Technology *Vol 40 No 3 2009* 496–514
doi:10.1111/j.1467-8535.2009.00963.x

Exploring the educational potential of virtual worlds—Some reflections from the SPP

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Abstract

This paper describes and reflects on the development of the Schome Park Programme (SPP), which was established with the specific aim of extending our thinking about schome, which aims to be the optimal educational system for the 21st century.

In an earlier stage of the Schome Initiative, it became clear that people find it almost impossible to break free from established conceptions of education. Open virtual worlds like Second Life® virtual world offer opportunities for people to have radically different 'lived experiences' of educational systems and thus seemed to be the ideal vehicle for exploring alternative models of education. The SPP therefore set out in late 2006 to use Teen Second Life® virtual world to support the development of the vision of schome, informed by current understandings about learning, pedagogy and the 'tools' available to us today.

This paper provides an overview of the first three phases of the SPP and briefly outlines the research methodologies used within it. This leads into a discussion of the potential of virtual worlds to support pedagogical exploration, which in turn leads to consideration of three dimensions of practice that emerged from the SPP. These three dimensions, which correspond closely with a framework developed in post-compulsory education, are illustrated by use of descriptions of activities and other data from the SPP. The paper concludes by raising questions about the extent to which pedagogical practices will change in the future as a result of the opportunities offered by virtual worlds.

Introduction

There is widespread agreement that current education systems are failing to meet the needs of individuals and society in the 21st century (eg, King & Frick, 1999; Prensky,

2006; Schank & Cleary, 1995). This reflects the rapid and accelerating pace of change in many aspects of life in the 21st century and a perceived 'skills gap' (eg, Leitch Review of Skills, 2006). Many of these changes are linked with technological developments, and the Internet in particular (Friedman, 2006). In the industrialised countries, dissatisfaction with current education systems is most evident in the compulsory education sectors, particularly those designed to cater for teenage learners. This is reflected in growing rates of disaffection in schools (Webb & Vulliamy, 2004), growing teenage truancy (eg, see http://news.bbc.co.uk/1/hi/education/4265536.stm) and the increasing migration of parents away from school and towards homeschooling (Curtis, 2004). In the UK, recognition of this growing problem underpins initiatives such as *Building Schools for the Future* which aims to rebuild or renew every secondary school in England over a 10–15-year period (http://www.bsf.gov.uk, retrieved online January 12, 2009). However, it is also clear that in the knowledge age, learning has to be a cradle to grave endeavour (Hargreaves, 2004). It is self-evident that learners' experiences in compulsory education, which occurs in the early stages of their lives, will have implications for post-compulsory educational provision.

The Schome Initiative was established in order to address these issues, and with the explicit aim of bringing about a radical rethinking of current education systems. The name schome is a play on the words school and home, though the intention was always that schome would be a system that supported 'cradle to grave' learning. Unlike most educational change efforts, the Schome Initiative starts from the assumption that reform of our existing systems will fail to deliver an optimal system; the degree of change needed is too great, as is the resilience of socially embedded complex systems (Twining *et al*, 2006). Thus, the Schome Initiative set out to develop a vision of schome (the optimal educational system for the 21st century), informed by what we know today and the 'tools' that we have available to us. Having established that vision of schome, the next stage will be to devise a strategy to move from where we are now (our current systems) to schome (the optimal education system identified in the vision). While the Schome Initiative is concerned with education systems in the broad sense, which would encompass the infrastructure and policies associated with supporting learners and 'accrediting' learning, the focus of this paper is on the pedagogical aspects of such a system.

After a number of 'vision building' ventures, including the Aspire Pilot which involved working intensively with two groups of young people over a 6-month period, it became clear that people found it almost impossible to break free from established conceptions of education. The visions that people developed were 'like now only better' (Sheehy & Bucknall, 2008). This is perhaps hardly surprising from a situated socio-cultural perspective in which knowledge cannot be separated from the activity and situation in which it is produced and learning is the product of negotiation rather than 'individual construction' (Murphy, 2008). People who have only ever experienced existing education systems and are immersed in the principles and patterns that define what is deemed appropriate or effective in a particular social system, what Gee (2003) refers to as the 'design grammar', will inevitably have limited capacity to conceive of radically different

models which entail paradigmatically different 'design grammars'. The obvious solution to this problem was to provide people with radically different 'lived experiences' of education systems in order to broaden their experience and engage them in thinking more explicitly about the 'design grammars' of existing and potential education systems.

Virtual worlds seemed to provide the ideal vehicle for providing people with such 'lived experiences' of radically different models of education for two reasons:

- They allow you to do things which it would be difficult or impossible to do in the physical world—both literally and pragmatically. Pragmatically, it would be more difficult and expensive to set up a new learning community in the physical world than in a virtual world. Literally, there are things you can do in virtual worlds that are not possible in the physical world, such as flying like a bird (without even having to flap your arms).
- Our experiences of virtual worlds suggested that these are spaces which encourage playfulness and testing of boundaries.

The Schome Park Programme (SPP) was launched at the end of 2006 with the aim of using virtual worlds (specifically Second Life® [SL]) to explore alternative models of education in order to inform thinking about schome (ie, the optimal education system for the 21st century). This paper provides a brief overview of the development of the SPP and the methodologies used in developing our thinking about dimensions of practice. It then explores the potential that virtual worlds offer for extending our thinking about pedagogy before focusing on three of the dimensions of practice that emerged, which coincide with Conole, Dyke, Oliver and Seale's (2004) model to inform learning designs. These dimensions relate to educational theory and practice as well as to the potential offered by virtual worlds.

The development of the SPP

Underpinning models

Schome is conceptualised as being a radically different form of education system—as defined within the Educational Programme Typology (Rix & Twining, 2007)—see Table 1.

While the Educational Programme Typology is useful in providing key defining characteristics of schome (and other types of educational programmes) these are at a macro level. In thinking about the design of the SPP, a more detailed analysis of the key dimensions of education was needed. This was provided by the e-Strategy Implementation Review (eSIR) Reference Statement (Twining *et al*, 2006) which focuses on five core aspects of any education system (see Table 2).

The eSIR Reference Statement was originally developed to provide an indication of the implicit vision of 'good practice' within the UK government's eStrategy (DfES, 2005). This was then refined and 'validated' through consultation with a wide range of stakeholders including policy makers, senior staff in local authorities and the Further

Table 1: The Educational Programme Typology (Rix & Twining, 2007, p. 337)

Type	*Programme title*	*Programme length*	*Dominant educational approach*	*Degree of learner choice*	*Opportunities to access setting*	*Age range*	*Regulation*	*Location*
Type 1	Alternative	Long or short term	Creative	High	Limited	Up to 18	Systemic	Fixed sites
Type 2	Last chance	Short term	Discipline	Low	Limited	Up to 18	Systemic	Fixed sites
Type 3	Remedial	Short term	Therapy	Low	Limited	Lifelong	Systemic	Fixed sites
Type 4	Special	Long term	Therapy	Low	Limited	Up to 18	Systemic	Fixed sites
Type 5	Home	Long or short term	Creative	High	Limited	Up to 18	Informal	Diverse sites
Type 6	Selective	Long or short term	Traditional	Low	Limited	Up to 18	Systemic	Fixed sites
Type 7	Comprehensive	Long or short term	Traditional	Low	Open	Up to 18	Systemic	Fixed sites
Type 8	Schome	Long or short term	Creative	High	Open	Lifelong	Systemic	Diverse sites
Type 9	Adult	Long or short term	Traditional	High	Limited	Post 18	Systemic	Fixed sites

Table 2: Summary of the e-Strategy Implementation Review Reference Statement (adapted from Twining et al*, 2006, p. 14)*

Aims	'Smarter learners better able to cope with changing contexts'—focus on enhancing learning, motivation and lifelong learning seen as important elements of this.
Environment	The learning environment is the whole environment of the learner that is recognised as being relevant to the education system. It has two components: • The spatial environment—where learning takes place. • The temporal environment—when learning takes place. Both the spatial and temporal environments that are considered relevant to the education system will expand. In particular, there will be greater emphasis placed on the home, working across physical settings and virtual settings, and extending 'the school day'. This is all summed up in the phrase 'anywhere/anytime learning'.
Actors	The 'actors' are people and/or organisations involved in supporting learning, including teachers, support staff, learners, learners' peers, parents and employers. There will be an increase in the involvement and availability of actors owing to the facilities that ICT offers, especially in relation to interaction 'at a distance'. In particular, greater emphasis will be placed on the role of parents. Collaboration will be a key element to this diversification of actors and environments. Learners' choice, responsibility and control will become increasingly important as part of the 'personalisation' agenda.
Curriculum	The curriculum includes everything that learners learn. There will be a broadening of the curriculum both in terms of the 'subjects' available and in learner choice. In particular, the curriculum is likely to offer more vocationally oriented options, and will place a greater emphasis on 'core skills'.
Support	The range and nature of support, which includes teaching, will increase and diversify as the environments, actors and curriculum expand. In particular, there will be an increase in learner choice about when, where and how learners are supported.

Education sector, and both commercial and voluntary sector organisations with an interest in the effective use of information and communication technology in education in the UK. The next section shows how the eSIR Reference Statement informed the development of the SPP.

Phases of development

The design of Schome Park (our island in Teen Second Life®) and the broader systems within the SPP explicitly reflected each of the five dimensions of the eSIR Reference Statement as summarised in Table 3, which describes how the SPP evolved through its first three phases.

The importance of student choice and 'empowerment' underpinned all three phases. This was reflected most strongly in the definition of the curriculum and the support

Table 3: Summary of key aspects of the first three phases of the Schome Park Programme

Aspect (from e-Strategy Implementation Review Reference Statement)	*Phase 1 (March to April 2007)*	*Phase 2 (June to December 2007)*	*Phase 3 (January to May2008)*
Our focus (Aims)	To explore the educational potential of virtual worlds (with a particular focus on developing Second Life skills and 'Knowledge Age Skills') To build a community of learners	To enhance 'Knowledge Age Skills' To increase student control and responsibility for the environment, the curriculum and support To widen the community (not just gifted and talented)	To enhance 'Knowledge Age Skills' To balance control and responsibility for the environment, the curriculum and support To widen the community and increase its size To explore the co-existence of the schome ethos with school culture
Environment	Island divided into six areas: • Physics • Ethics and philosophy • Archaelogy • Scho-op (generic support) • Shared meeting areas • Sandbox Island, wiki and forum available 24/7/365	Island as naturalistic and attractive environment with some core generic areas—student control of planning/building Island, wiki and forum available 24/7/365	Two islands: One student controlled + one staff controlled Immersive game theme for new island Island, wiki and forum available 24/7/365
Actors	• 250 students aged 13 to 17, from the National Association of Gifted and Talented Youth • Staff from four universities • Staff from the National Physical Laboratory • PhD students • Consultants	• Ongoing 13–17 year-old students from Phase 1 • New 13–17 year-old students from range of sources (including USA) • Staff from two universities • PhD students • Consultants • Teachers • Parents	• Ongoing 13–17 year-old students from Phase 2 • New 13–17 year-old students from range of sources, including: South East Grid for Learning (broadband consortium) and 'School groups' from UK and USA • Staff from two universities • PhD students • Consultants • Teachers • Parents

Table 3: Continued

Aspect (from e-Strategy Implementation Review Reference Statement)	*Phase 1 (March to April 2007)*	*Phase 2 (June to December 2007)*	*Phase 3 (January to May2008)*
Curriculum	• Three strands of formal activity (Physics, Ethics and Philosophy, Archaeology) • Discrete 'taught sessions' (eg, research methods) • Student-led activity	• Student-led activity (including continuation of formal strands from Phase 1) • Machinima creation • Discrete 'staff led' sessions (eg, Sudoku)	• Student-led activity (including continuation of strands from Phase 2 and new strands such as Time Travellers) • New strands led by staff (eg, Maths)
Support	• Staff-scheduled sessions for each formal curriculum area • Information in wiki • Discussion in forum • Emergency help button to summon staff • Peer–peer support	• Peer–peer support • Staff available to provide support in Schome Park • Information in wiki • Discussion in forum • Emergency help button to summon staff	• Peer–peer support • Greater staff support for strands of activity (eg, Maths) • Greater support for student-led activity • Information in wiki • Discussion in forum • Emergency help button to summon staff

provided. Thus, for example, even in Phase 1 where the staff planned and implemented three strands of formal activity, students were encouraged to identify and help implement their own activities. The staff attempted to provide support for all the activities in ways which assisted the students in taking greater control of and responsibility for their own learning. Students were also encouraged to become actively involved in the research aspects of the SPP.

Research methodology

The research methodology within the SPP merged features of case study and quasi-experimental design. A 'complete' learning environment was created within which certain variables, such as the curriculum and the design of the virtual space, were varied over the phases of the programme.

A range of data were collected, including:

- Chatlogs of all conversations that staff were privy to in Schome Park (text chat was used instead of voice within Schome Park and staff were required to have a note above their avatar's head at all times which said they were logging chat);
- In-world photographs of activities taking place and the artifacts created;

- Machinima (in-world films) of activities;
- Participant observation;
- Entries by students and staff in the schommunity forum, wiki and blogs (which included explicit reflections upon the students' experiences of learning within the SPP);
- Informal interviews (of staff and students by staff and students) both in-world and via the forum and Flashmeeting (http://flashmeeting.open.ac.uk);
- Sensor data showing the location of all avatars present on Schome Park once every 5 minutes;
- Recordings of staff meetings (via Flashmeeting);
- Usage data for the schommunity wiki and forum.

All participants involved in the SPP were fully aware that they were taking part in a research project. In keeping with the British Educational Research Association's ethical guidelines (BERA, 2004), all the students and their parents signed informed consent forms, and had the option to withdraw their data from the data analysis at any point without having to give an explanation. Students were encouraged to engage with the research both as informants and participant researchers. For example, there were 'taught sessions' on research methods such as interviewing, following which some students conducted in-world interviews with other students.

Over the phases of the SPP, dimensions of practice started to emerge which appeared to be informative in helping to distinguish between activities. These were refined through an iterative process which included: testing against different activities; triangulation across the different sources of data; peer and participant review. This process led to the development of a range of dimensions of practice, three of which are explored in this paper. However, it also highlighted the potential of open virtual worlds as environments for exploring pedagogy.

Virtual worlds are 'unclaimed spaces'

Our experiences in the SPP suggest that open virtual worlds are unclaimed spaces as far as education is concerned—educators have not yet established norms of how to support learning within them. This was clearly reflected in the way that our use of Schome Park evolved over the first three phases of the SPP.

We started by building Schome Park in ways that replicated our physical world experiences of educational spaces—an approach that is evident in many university islands in SL where the virtual presence is a university campus (Kirriemuir, 2008), which is often a replica of at least part of the university's actual physical campus. As we moved through the first three phases of the SPP, our understanding of the 'design grammar' of virtual worlds changed. These changes were reflected in the design of the island which moved away from our conceptions of physical education spaces and towards conceptions of 'an online game space' (as illustrated in Figures 1–3).

Figure 1: The initial design of Schome Park with designated areas for each of the curriculum strands plus a central resource area

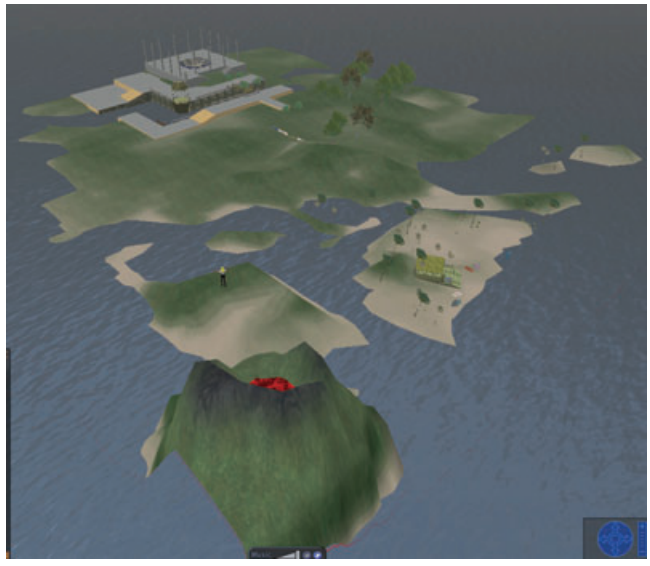

Figure 2: The second phase of Schome Park during which we removed the designated curriculum areas and moved to a more naturalistic setting—with most space left for student development

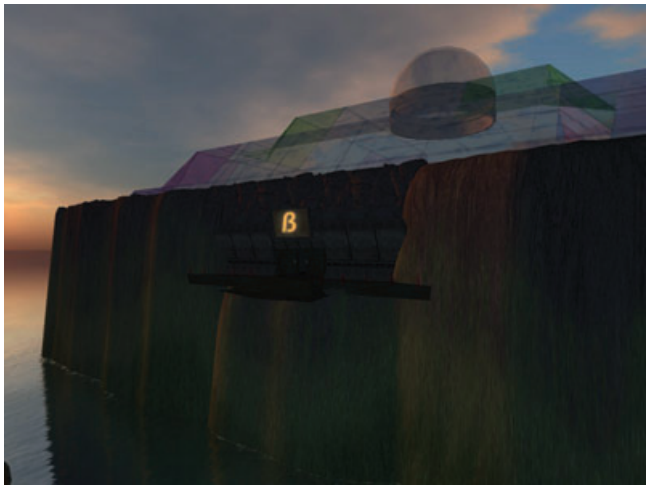

Figure 3: The third phase of redevelopment of Schome Park in which we moved to a more integrated and immersive design informed by online games and built around a 'back story'

Our original design reflected our lack of understanding of the differences between virtual and physical spaces or how to capitalise on the opportunities that these new spaces offer. A simple example of these differences between virtual and physical spaces is in the significance of buildings:

- In the physical world, buildings fulfil essential functions, including protecting people from the weather and providing solid structures which can support furniture such as whiteboards.
- In the virtual world, buildings do not fulfil these functions; if it rains in the virtual world, your avatar does not get wet or feel cold, and you do not need walls or floors to support furniture as it can simply float in mid-air.

These differences in 'the meaning' of space between the physical and virtual world are reflected in the gradual evolution of the design of Schome Park as we moved from Phase 1 to Phase 3 (see Figures 1–3).

Such differences have significant and far from trivial implications for the design of educational activities. Our experiences in the SPP suggest that people have different expectations about how to behave in physical and virtual worlds. From the outset, the students behaved in ways which contrasted radically with the experiences that staff had had in their previous, physical world interactions with young people on 'educational projects'. For example, staff, who were used to running creative workshops and vision-building activities with teenagers in the physical world, designed the initial events in Schome Park in ways that reflected these physical world understandings. Thus, at the start of Phase 1, staff organised induction sessions to help newcomers to Schome Park gain the confidence to become proactive within the environment, both in

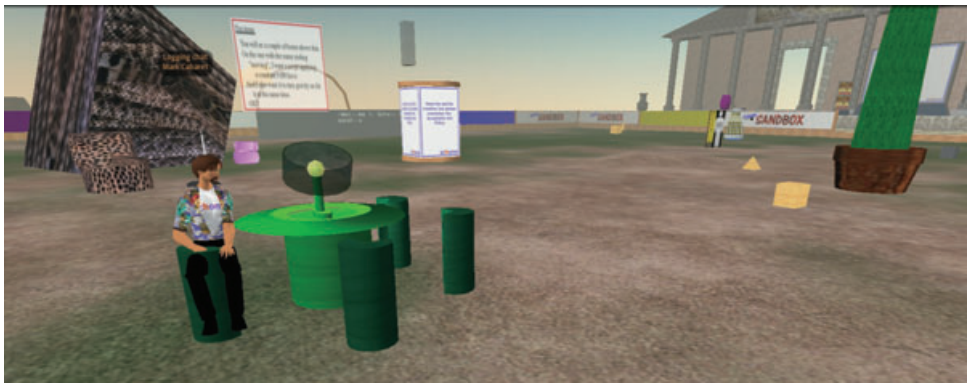

Figure 4: An induction session—where have all the students gone?

terms of their social interactions and their ability to utilise the functionality that the virtual world software offered. Students were expected to attend an induction session as their first introduction to the island. The students' avatars would duly arrive on Schome Park at the appointed time and in the location where the induction session was taking place. A member of staff would start to explain the purpose of the induction session and how it was organised, only to find that all the avatars had flown off to explore the island on their own, only returning if they had a specific (technical) problem that they needed help with (Figure 4 shows a member of staff at one such induction session). We have never experienced students in physical world settings behaving in this way!

Thus, virtual worlds provide an environment in which space takes on new meanings and people bring different understandings about how to behave. In this context, many staff within the SPP found it difficult to know what sorts of activities to implement or how best to organise them. This lack of understanding of how to use virtual worlds to support learning is in stark contrast with the physical world where, as we saw with our earlier vision-building activities within the Schome Initiative, there are clearly established and dominant models of education in the physical world—say the word 'school' (or 'university') and most people (in the industrialised world at least) will conjure up a picture of a classroom (or lecture theatre) and will have clear ideas of the sorts of activities that take place within it. This 'uncertainty' about how best to utilise the virtual space to support learning offered the opportunity for pedagogical experimentation, from which emerged a range of dimensions of practice.

Dimensions of learning

Conole *et al* (2004) presented a model for the design of learning in post-compulsory education consisting of three key dimensions, which are summarised in Figure 5. Conole *et al* (2004, p. 22) claimed that their model had a number of uses, including:

- as a process enabling practitioners to evaluate their own practice and make more explicit their underpinning pedagogical approaches and how these approaches inform their learning and curriculum design;
- as a tool to help plan, design and profile learning opportunities.

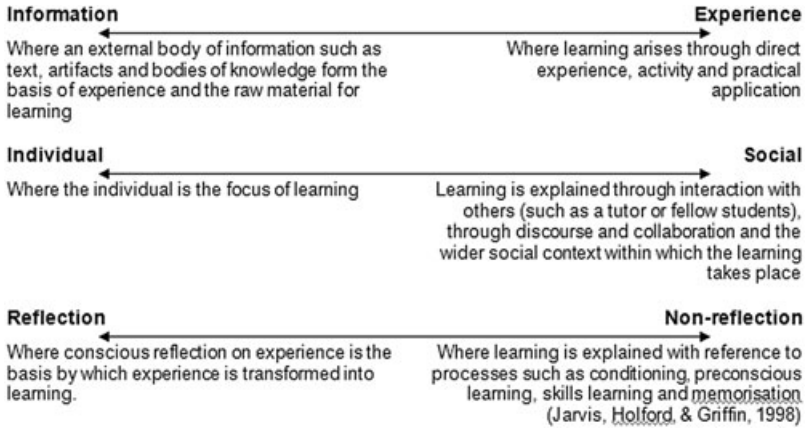

Figure 5: Conole et al's model for the design of learning (adapted from Conole et al, 2004, pp. 22–23)

These three dimensions map directly onto three of the dimensions of practice which had emerged independently within the SPP. This correspondence reinforces the importance of these three particular dimensions and demonstrates that while the 'schome dimensions' emerged from work with 13–17 year-olds, they are equally relevant to learners in post compulsory education.

The 'Pedagogy' dimension

Over the three phases of the project, students (and staff) took part in a wide range of activities, which varied in the degree of immersion in the virtual environment that they involved. In all cases, the participants' avatars were immersed in the sense of being present in the virtual world; however, the nature of their engagement varied considerably. This appeared to be an important distinguishing feature, which corresponds with Conole *et al*'s (2004) Information versus Experience dimension. Figure 6 represents this as a dimension of practice which we labeled 'Pedagogy'.

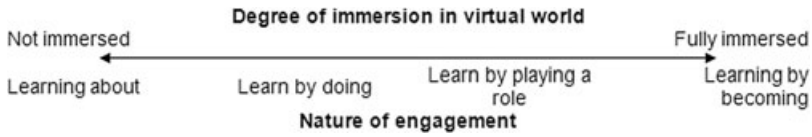

Figure 6: The 'Pedagogy' dimension

This dimension maps closely onto the distinction that Scardamalia and Bereiter (2006, p. 101) make between 'knowledge *about'* and 'knowledge *of':*

> Knowledge *about* sky-diving, for instance, would consist of all the declarative knowledge you can retrieve when prompted to state what you know about sky-diving. Such knowledge could be conveniently and adequately represented in a concept net. Knowledge *of* sky-diving, however, implies an ability to do or to participate in the activity of sky-diving. It consists of both procedural knowledge (eg, knowing how to open a parachute and guide its descent) and declarative knowledge that would be drawn on when engaged in the activity of sky-diving (eg, knowledge of equipment characteristics and maintenance requirements, rules of particular events). It entails not only knowledge that can be explicitly stated or demonstrated, but also implicit or intuitive knowledge that is not manifested directly but must be inferred ... Knowledge *of* is activated when a need for it is encountered in action. Whereas knowledge *about* is approximately equivalent to declarative knowledge, knowledge *of* is a much richer concept than procedural knowledge.

Four examples of activities are described below which help to illustrate the Pedagogy dimension.

Learning about—archaeological artifacts

One of the formal curriculum strands in Phase 1 of the project was archaeology (see Table 3). The initial archaeology activity involved an in-world discussion of museums focused on learning about their function and thinking about their future. This was followed by sessions in which students gathered information about artifacts and created a museum display about them. These activities involved 'teacher' led discussions in Schome Park, independent research by the students using information books and the Internet, and finally the creation of in-world museum displays.

While the students were in-world for the initial discussions about museums, and in that sense they were immersed in the environment, they could equally well have carried on these discussions using synchronous chat tools. The independent research took place outside Schome Park and thus was clearly not 'immersive'. The creation of the displays was immersive in the sense that the students were in-world and were creating replicas of the artifacts, so they were in Schome Park, and one could argue they were learning by doing. However, this activity did not inform thinking/understanding about the historical artifacts, so the learning that was taking place was about how to build in Schome Park.

Learn by doing—playing chess

In all three Phases, different groups of students engaged in creating chess sets and/or playing games of chess. Creating chess sets involved knowledge about chess, which was reinforced through the process of crafting the pieces, a non-trivial task if you are trying to create 'traditional' style pieces. Playing the game involved learning by doing. One of the groups created a giant chess board and then played games of chess in teams, with more experienced players working with less experienced ones in deciding what moves to make.

Learn by playing a role—getting married

A large number of the student-initiated activities involved 'acting out' real-life events which adults engage in but children are usually excluded from (or are only marginal players within). For example, in both Phases 1 and 3, there was a wedding. In each case, the students followed fairly traditional (Western) models of weddings, with a wedding ceremony with bride and groom making vows, followed by a reception in which people danced. In both cases, the wedding included an official photographer who filmed the whole event.

The students were very clear that they were taking on roles in these contexts, as is evident from this extract from one of the in-world conversations in which a member of staff challenged the appropriateness of getting married in Schome Park:

Member of staff: and indeed the fact that we are sanctioning you guys getting married might be seen as inappropriate
Groom to be: though it isnt marriage
Groom to be: surely they can see that?
...
Groom to be: its a bit of fun
(Extract from in-world chatlogs)

Learn by becoming—regattas

One of the most popular activities in Schome Park emerged from a particular interest of one of the students who was a keen sailor in the physical world. He instigated a regatta in Phase 1 and these became regular events throughout Phases 2 and 3. Participants in these events took on roles in the sense of actually becoming the role—as opposed to play acting as was the case in the weddings. So, for example, a student would take on the role of race officer and would coordinate all aspects of the regatta, including: publicizing the events (which sometimes spanned 2 or 3 days); setting out the course with marker buoys; posting a map of the course (with different courses for different events/categories of boat); checking that the boats complied with the rules for each race; managing the races, including arbitrating over any disputes; recording the results; and so forth (see Peachey, Gillen & Ferguson [2008] for a more detailed description of two of the Schome Park regattas).

The 'Theoretical' dimension

While the Pedagogy dimension is helpful in distinguishing between learning activities, it is clearly not sufficient in isolation. Within the second and third phases of the SPP, some key differences between learning in schools and learning in Schome Park became very evident as the nature of the student population within Schome Park changed. In Phase 1, the majority of the students were 'isolated individuals', in the sense that most of them had never met each other in the physical world; whereas in Phases 2 and 3, with the introduction of 'school groups' of students, an increasing number of members of the community knew each other in the physical world.

Figure 7: The 'Theoretical' dimension

Perhaps the most extreme example of these differences between learning in school and Schome Park was provided when a student, who had recently joined the community along with his teacher and classmates, posted a message in the Schommunity forum asking for help in answering some questions about the SPP that his teacher had set as homework. Within 4 minutes, an established member of the community had posted a response to all but three of the questions, which was followed 12 minutes later by a response from another established student who answered the remaining questions. This sparked a discussion within the community about whether or not this was cheating, which highlighted an important distinction between the Schome Park world view and what might be characterised as 'a traditional education perspective'. This is represented in Figure 7 as the 'Theoretical' dimension, which corresponds with Conole *et al*'s (2004) Individual versus Social dimension.

What this dimension highlights is that implicit in many aspects of activity in formal education is an individual constructivist view of the learner within which the focus of attention (and assessment) is on individuals working 'on their own'. In contrast, implicit within the Schome Park view is a socio-cultural model which sees knowledge as being distributed, rather than being 'in the head of an individual'. Thus, the focus is on what individuals can do in collaboration with others:

> Schools tend to care only about what is inside students' heads as their heads and bodies are isolated from others, from tools and technologies, and from rich environments that help make them powerful nodes in networks. (Gee, 2003, p. 189)

Avatars as reflective tools

Murphy and McCormick (2008, p. x) argue that from a socio-cultural perspective, learning is 'a process of becoming competent and belonging, ie, becoming a particular type of person' and that this makes knowledge and identity interdependent. Similarly, Gee (2003) argues that identity is crucial to learning in that 'all learning in all semiotic domains requires identity work. It requires taking on a new identity and forming bridges from one's old identities to the new one' (p. 51). He argues that games which involve the use of avatars (virtual characters controlled by the user) provide fertile ground for engaging in identity work. This view is supported by Geser (2007) who states that 'online identities tend to raise individual consciousness insofar as they evoke or enforce additional self-reflection' (p. 4). Conole *et al*'s (2004) model highlights the importance of reflection in learning.

Schön (1983) argued that many problems facing professionals in real situations do not resemble the cases taught in college and cannot be solved by applying formal knowledge or principles. Instead, professionals rely upon what Schön (1983) refers to as 'knowl-

edge in action', which corresponds with Scardamalia and Bereiter's (2006) notion of 'knowledge *of*'. This is implicit knowledge which builds up through practice and often cannot be articulated. Reflection provides a mechanism for making such tacit knowledge explicit, and thus subject to evaluation and sharing with others.

Discussions within the SPP suggest that staff and students were engaged in reflecting upon their identities, those of their avatars and the interrelationships between these two, as evidenced by the following extract from one discussion thread:

> My avatar looks completely different to me in real life, and I enjoy that. The ability to change my persona every day if I wanted, is really good, you can reflect your mood like sometimes I might change my hair colour for different reasons. (Schomer A, January, 19, 2008)
>
> I have to say that I see my avatar as just that- a representation of myself and no more. Of course, I act differently in SL to how I act in RL, but in the same way as I act differently when with my school friends to with my parents. My avatar is an extension of myself rather than something in its own right, and that (and the fact that I lack imagination) is why it looks pretty much like I do- though I don't actually wear leather jackets all the time. Maybe that's because I'm just a very boring person. 😁 (Schomer B, January 19, 2008)
>
> ---
>
> I agree with Schomer B here-my avatar is not exceptional in any way, I don't think, albeit it has remained exactly the same since the start of the project. I guess I'm more interested in what I do than what I am. (Schomer C, January 19, 2008)
>
> Oh, my avatar is nothing like me- its tall to start off with! 😊
>
> ---
>
> But on Schome I am just myself- I'm not a different person… I am just free to express myself more- there is a side of me with people on Schome see whilst some of my friends dont. Its just the way I am- apart from the av- *she* can carry off shorts! 😳 (Schomer D, January 20, 2008)
>
> … I enjoy being a male avatar sometimes and a female avatar sometimes—and indeed chose 'SParker 1's name' to enable me to switch in that way. The reason for that is that I am very interested in language and wanted to watch myself to see if I talked in a different way when I am being a male avatar from a female avatar—and to see whether others reacted differently. I never 'hide' though if someone wants to know what I am in RL (subject to the anonymity cloak around we staff—which is more than a little permeable sometimes though we can't help but see).
>
> A fascinating thread. I so much enjoy meeting people in this project online and gaining such strong impressions of capable, joyful, lively and kind human beings that are not simply 'behind' the avatars but manifested through them. (SParker 1, January 23, 2008)

One factor here seems to be that the use of avatars engages people in an explicit process of projecting themselves, which inevitably involves a degree of reflection and self-analysis. Geser (2007) argues that virtual worlds go further than this and claims that:

> More than other interactive online settings, Metaverses like Second Life may induce a rather deep dissociation between the invisible acting 'I' in the background and the visible performing 'me' on the screen. In SL, this is happening particularly in the case when I choose the default 'observer' mode where I can see my own avatar acting. This implies that I take a decentered, objectivized stance toward my avatar: not unlike the observing position I take to all others. By observing

> myself, I can take a self-reflective, critical attitude toward my nonverbal performances and their effects on others. (Geser, 2007, p. 7)

Thus, avatars provide a vehicle to support reflection on practice—directly addressing the need to make tacit knowledge explicit and enabling learners to reflect critically on their experiences and understandings.

The previous quote from Geser suggests that some participants in the community were not only reflecting on their own experiences, but were also experimenting with how they presented themselves and the impacts that this had on others. If one accepts a socio-cultural perspective, in which learning and identity formation are inseparable, and that the use of avatars encourages reflection on one's identity and 'performances', then open virtual worlds provide a rich context for enhancing reflection on learning.

Conclusions

The SPP was intended to enhance our understanding of what schome (the optimal education system for the 21st century) might be like. In the introduction, we argued that virtual worlds seemed to be a good vehicle for providing people with 'lived experiences' of radically different models of education because they:

- allow you to do things which it would be difficult or impossible to do in the physical world—both literally and pragmatically;
- encourage playfulness and testing of boundaries.

It became clear within the SPP that virtual worlds are spaces where people, including educators and learners,

> are freer to play out their personal preferences without being constrained by established roles and behavioral expectations (de Nood & Attema, 2006, p. 20).

Virtual worlds provide new frontiers (Castronova, 2007) and, as the examples of activities within Schome Park illustrate, they can be used in a wide variety of ways (spanning 'learning about' to 'learning by becoming' on the 'Pedagogy' dimension), many of which potentially support a shift towards socio-cultural models of education. Virtual worlds, through their use of avatars, also provide the potential to enhance reflection as a vehicle for learning.

Logic suggests that part of the problem for educators in thinking about how to design educational activities in virtual worlds relates to our lack of familiarity with designing immersive activities. Most formal education in the physical world focuses on 'learning about' and 'learning by doing' (on the pedagogy dimension). Educators are less familiar with implementing activities that map onto the 'learning through role play', let alone the 'learning by becoming' categories on the pedagogy dimension. Our experience suggests that one way to help overcome this is to provide sets of in-world resources which support specific scenarios. For example, when some students in Schome Park

built a courtroom and provided the associated trappings such as wigs and gowns for the judge and barristers, it suddenly became very easy to see how someone working in legal education might use that 'courtroom toolkit' with their students to learn about aspects of our legal system. The more difficult problem, perhaps, is in helping educators move from an individual constructivist to a socio-cultural approach on the 'Theoretical dimension'. This represents what Cuban (1988) referred to as a second-order change; a change which introduces 'new goals, structures and roles that transform familiar ways of doing things into new ways of solving persistent problems' (p. 342). Cuban goes on to identify that while first-order changes succeed, second-order changes are 'either adapted to fit what existed or sloughed off, allowing the system to remain essentially untouched' (p. 343).

What remains to be seen is whether or not educators will progress past 'Phase 1', in which we merely replicate real-world educational structures. Will we be able to take full advantage of the potential that these new unclaimed spaces offer and if so, what impact, if any, will this have on pedagogies in the physical world?

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